

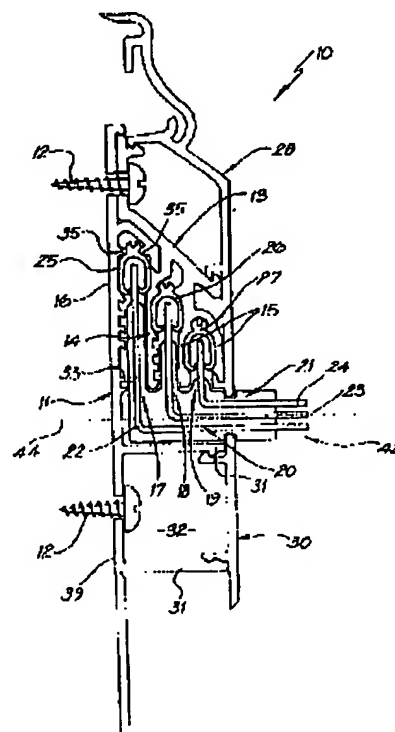
**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification 6 :</b> <b>H01R 25/14, 31/06, H02G 5/04</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 98/11634</b> <b>(43) International Publication Date:</b> 19 March 1998 (19.03.98)
<b>(21) International Application Number:</b> PCT/AU97/00589 <b>(22) International Filing Date:</b> 10 September 1997 (10.09.97) <b>(30) Priority Data:</b> PO 2229 10 September 1996 (10.09.96) AU <b>(71) Applicant (for all designated States except US):</b> UNIVERSAL POWER TRACK PTY. LTD. [AU/AU]; Suite 2, 210 The Entrance Road, Erina, NSW 2250 (AU). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> SINCLAIR, John, Ashton [AU/AU]; Suite 2, 210 The Entrance Road, Erina, NSW 2250 (AU). <b>(74) Agent:</b> SPRUSON & FERGUSON; G.P.O. Box 3898, Sydney, NSW 2001 (AU).	<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> With international search report.	

**(54) Title:** AN ELECTRICAL TRACK AND ADAPTER ASSEMBLY**(57) Abstract**

An electrical supply assembly (10) which includes an elongated base (11) which receives longitudinally extending conductors (29). The conductors (29) are formed by a plurality of "U" shaped ribs joined by longitudinally extending strips (37). An adaptor (40) is mounted on the assembly (10) and is provided with pins (22, 23 and 24) to engage the conductors (29). The adaptor (40) has a base (45) within which there are located sockets (57) to be engaged by the pins of an electric plug. The sockets (57) are attached to the pins (22, 23 and 24). The base (45) is rotatable so as to move the pins (22, 23 and 24) into contact with the conductors (29). A shutter member (47) is located within the base (45) to selectively provide access to the sockets (57).



**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	IS	Iceland	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Cote d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

## AN ELECTRICAL TRACK AND ADAPTER ASSEMBLY

## Technical Field

The present invention relates to electricity supply apparatus and in particular to a track assembly to be used in conjunction with a plug to provide an electricity supply at the plug.

## Background of the Invention

Described in International Application PCT/AU95/00675 is a flexible ducting system. The ducting system described in the following specification is a modification of this earlier ducting system.

10 The present inventions are also an improvement in the invention which is the subject of Australian Patent 655069. The track electric supply system described in this earlier patent has several shortcomings. In particular the conductor has difficulty maintaining contact with the plug and access to the conductors is not inhibited and therefore accidental contact may occur with the positive and neutral conductors.

15 New Zealand Patent 207995 discloses an electrical distribution system. The system includes a rigid track which receives insulating material within which there is located conductors to be engaged by a plug. The conductors are of a "U" transverse cross section with longitudinally spaced extremities which are to engage pins of the plug. The extremities are spaced as are the similar extremities of the conductors discussed the above mentioned PCT application.

20 International Patent Publication WO 93/19506 (International Application PCT/NO93/00044) describes a rail electrical system. The rail has a plurality of slots, with each slot receiving an elongated conductor. The engaged conductors is a plug which is rotatable between an engaged and a non-engaged position. The conductors are merely elongated metal strips which are not connected.

25 The conductor of Australian Patent Application 70863/74 is of a similar construction in that the conductors are merely metal strips not connected.

The conductor of German Specification 3030449 A1 describes a rail type electrical supply system, with the conductor being a metal wire of circular transverse cross section.

30 USA Patent 5399094 discloses a device for digital data transmission. The device employs a strip like metal contact.

UK Patent 1597415 discloses a rail type electrical supply system in which the conductors are longitudinally extending strips, with the strips not being connected.

35 Australian Patent Application 91501/82 describes a rail type electric supply system in which the conductors are of a "U" configuration in transverse cross section throughout the length.

USA Patent 2240180 again shows a rail electric supply system in which the conductors are of a "U" configuration with the arms of the conductor being spaced.

UK Patent 1508788 also shows a rail electric supply system with the contact being space metal strips which are not joined.

5 The above mentioned electric supply system suffers from the disadvantage that they do not provide for good contact between the conductor and any plugs or contacts employed.

### Object of the Invention

10 It is the object of the present invention to overcome or substantially ameliorate the above disadvantages.

### Summary of the Invention

There is disclosed herein an elongated flexible electric conductor of unitary construction, said conductor comprising:

15 a pair of generally parallel coextensive electrically conductive strips; and  
a resilient support urging the strips into contact, said support being resiliently deformable upon transverse relative displacement of the strips when an item to electrically contact the strips is placed therebetween, said support including a plurality of generally "U" shaped ribs providing arms, said ribs extending generally transverse of the strips so that each rib has a respective one of its arms attached to an associated  
20 one of the strips.

There is further disclosed herein an electric supply assembly an electrical supply assembly, said assembly comprising:

25 an elongated base providing a plurality of generally parallel coextensive slots separated by generally rigid dividing walls, the slots extending from an access passage;  
a flexible insulator extending along each slot;  
an elongated conductor located in each insulator; and wherein  
said access passages enables insertion of a conductive pin in a respective one of the slots for engagement with the conductor located therein.

30 There is still further disclosed herein an electrical adaptor an electrical adaptor for use with an electric supply assembly having an elongated base within which there is located a plurality of elongated conductors to be engaged by the adaptor, said adaptor comprising:

a mounting to engage the assembly so as to be affixed thereto;  
35 an engaging portion with a stem having radially extending pins to enter the assembly to engage the conductors, the engaging portion being pivotable relative to said base about a longitudinal axis of the stem between a first position at which the conductors are engaged by the pins, and a second position allowing removal of the

engaging portion from within the assembly, said engaging portion also having sockets to engage pins of an electric plug;

a base fixed to said engaging portion so as to move therewith, said base generally enclosing said sockets and having apertures aligned with said sockets to provide or access of the electric plug pins to said sockets; and

shutter means to close said apertures when said engaging portion is in said second position but allow access to said sockets when said engaging portion is in said first position.

### Brief Description of the Drawings

A preferred form of the present invention will now be described by way of example with reference to the accompanying drawings wherein:

Figure 1 is a schematic end elevation of an electrical supply assembly;

Figures 2 to 6 are schematic end elevations of portions of the assembly of Figure 1;

Figure 7 is a schematic perspective view of a flexible conductor employed in the assembly of Figure 1;

Figure 8 is a schematic end elevation of the conductor of Figure 7;

Figure 9 is a schematic front elevation of an adaptor to be used with the assembly of Figure 1;

Figure 10 is a schematic front elevation of the adaptor of Figure 9 in a second operative position;

Figure 11 is a schematic perspective view of the adaptor of Figure 9;

Figure 12 is a schematic rear perspective view of the adaptor as seen in Figure 11;

Figure 13 is a schematic section side elevation of the adaptor of Figure 9;

Figure 14 is an schematic perspective view of modification of the adaptor of Figure 9;

Figure 15 is a schematic rear elevation of the adaptor of Figure 14;

Figure 16 is a schematic front elevation of the adaptor of Figure 14;

Figure 17 is a schematic top plan view of the adaptor of Figure 14;

Figure 18 is a schematic part sectioned side elevation of the adaptor of Figure 14;

Figure 19 is a schematic end elevation of a modification of the supply assembly of Figure 1;

Figure 20 is a schematic end elevation of a divider member employed in the assembly of Figure 19;

Figure 21 is a further schematic end elevation of the divider member of Figure 20; and

Figure 22 is a schematic end elevation of an insulating member employed in the assembly of Figure 19.

#### 5 Detailed Description of the Preferred Embodiments

In the accompanying drawings there is schematically depicted an electrical supply assembly 10 which for example may also be used as a skirting board in a building. The assembly 10 includes a base 11 which is intended to be fixed to a supporting wall by means of threaded fasteners 12. The base 11 includes a  
10 longitudinally extending divider member 13 providing rigid walls 14 and 15 which co-operate with the end wall 16 to define and separate three generally parallel co-extensive slots 17, 18 and 19. The slots 17, 18 and 19 are open to a horizontal access passage 20. The slots 17, 18 and 19 open into the passage 20, which passage 20 extends to a longitudinally extending access slot 21 which enables "L" shaped pins 22, 23 and 24 to  
15 extend through the passage 20 and into engagement with longitudinally extending flexible conductors 29 located within flexible insulators 25, 26 and 27. The pins 22, 23 and 24 are generally flat in configuration so as to have generally planar side surfaces which engage conductors 29.

The insulators 25, 26, and 27 are spaced from the passage 20. Typically the  
20 electric conductor 29 is as illustrated in Figures 7 and 8. The slots 17, 18 and 19 extend upwardly from the passage 20. The base 11 further includes a cover member 28 which snap engages on the divider member 13. A further cover member 30 is provided which snap engages on walls 31 extending from the base back portion 39. The cover member 30 and walls 31 cooperate to provide a longitudinally extending cavity 32  
25 which can receive cabling or other items.

The rigid walls 14 and 15 provide for secure separation of the conductors 29, thereby preventing incorrect contact with the pins 22, 23 and 24. The walls 14 and 15 also inhibit other objects being inserted and contacting the active conductor 29.

Preferably at least one or all of the slots 17, 18 and 19 is/are closed by a  
30 flexible longitudinally extending flange 33, which is resiliently deflected from a closing position to a position providing access to the flexible conductor 29 enclosed within the associated insulator 25, 26 or 27.

Each of the insulators 25, 26 and 27 is provided with longitudinally extending recesses 34 which engage with correspondingly extending ridges 35 on the base 11, to  
35 aid in retaining the insulators 25, 26 and 27 in a position within their respective slots 17, 18 and 19.

Each conductor 29 includes a plurality of ribs 36 which are of a "U" configuration extending via arcuate portions 37 to a pair of generally parallel co-extensive strips 38. The strips 38 having abutting generally planar contact surfaces 90. The conductor 29 is manufactured from suitable conductive material (such as copper or bronze) and is flexible so that it may be bent about a transverse axis located generally within the plane of the strips 38 but normal to the longitudinal direction of extension of the conductor 29 (a vertical axis). The conductor 29 is formed of material which is sufficiently resilient that one of the pins 22, 23 or 24 can pass between the surfaces 90 of the strips 38, but bias the strips 38 into contact with the pin. This ensures a good electrical connection. At rest the strips 38 are in contact when in contact with the pins 22, 23 and 24 the surfaces 90 are generally parallel.

In Figures 18 to 21 of the accompanying drawings there is schematically depicted a modification of the above discussed divider member 13. In this modification a divider member 70 is provided which is an assembly of a divider base 71 having rigid walls 72, 73 and 74 which cooperate to provide the coextensive slots 18 and 19 as described in the previous embodiment. However, the base 70 also provides a longitudinally extending barb 75 to which is attached a slot forming insulating member 76. The slot forming member 76 has a pair of longitudinally extending barbs 77 which cooperate to snap engage with the barb 75. The member 76 would provide the longitudinally extending slot 17 described in the previous embodiment.

The assembly 10 of Figure 19 includes the basic construction of the assembly 10 of Figure 1. However, in this embodiment the wall 16 has a pair of projections 91 which snap engage the divider member 70 to secure the divider member 70 to the wall 16.

The walls 72 and 73 are provided with barbs 92 to aid in retaining the insulators 76 (25), 26 and 27 in position. Each of the insulators is of a "U" configuration so it has to have an arcuate top from which there extends a pair of legs terminating with resilient flanges at their extremities. When a pin enters any one of the insulators, the flanges are deflected enabling contact of the pin with the conductor 29 located therein.

Again the rigid walls 72, 73 and 74 prevent incorrect engagement of the pins 22, 23 and 24 with a conductor located between the walls 72, 73 and 74.

The member 76 would also be formed of flexible insulating material and therefore would be equivalent to the insulator 25 of the previous embodiment. The slots 18 and 19 would receive insulators 26 and 27 of the previous embodiment. Again the insulators 25, 26 and 27 would each receive a conductor 29.

The conductor 29 is of a unitary construction and as discussed above is flexible so that it may be bent about a vertical axis generally transverse of the conductor 29.

The conductor 29 may also be bent about a horizontal axis transverse of the conductor 29. As best seen in Figures 7 and 8 the conductor 29 has a pair of parallel generally coextensive strips 38 which engage the pins 22, 23 and 24. When not engaged with the pins 22, 23 and 24, the strips 38 are in contact. However, again as discussed above, upon one of the pins 22, 23 or 24 being inserted between a pair of the strips 38, the strips 38 part but are urged into contact with the associated pins 22, 23 or 24 due to the resilience of the conductor 29, and more particularly the resilience of the ribs 36. By urging the strips 38 into contact with the pins 22, 23 and 24, electrical contact is enhanced.

Again, as best seen in Figures 7 and 8, the conductor 29 includes a plurality of spaced ribs 36, with each rib including a base 88 which is of arcuate configuration and joined to a pair of arms 89 which are generally parallel and coextensive. The arms 89 extend to the arcuate portions 37 which in turn extend to the strips 38. The strips 38 are located between the arms 89.

When one of the pins 22, 23 or 24 is located between an associated pair of the strips 38, adjacent portions of the strips 38 are deflected relatively to each other transversely of the conductor 29.

In this embodiment the pin 22 would be the active connection, the pin 23 the neutral connection and the pin 24 the earth connection.

In Figures 9 to 14 there is schematically depicted an adaptor 40 to be used in conjunction with the assembly 10. The adaptor 40 engages the conductors 29 and provides a socket, which for example can receive the pins of a conventional electric plug.

Adapted to engage the assembly 10 is a mounting plate 41. The plate 41 has a flange 42 which projects into the slot 21. The adaptor 40 has a stem 43 from which the pins 22, 23 and 24 generally radially extend. The stem 43 is inserted through the slot 21 to enter the passage 20. When the stem 43 is fully inserted it is rotated about the axis 44 until the pins 22, 23 and 24 engage the conductors 29. The earth pin 24 engages first, and is also last to disengage.

The adaptor 40 includes a base 45 which has a rear plate 53 and apertures 46 which are conventionally positioned to receive the pins of a conventional plug. Movably mounted in guides is a shutter member 47 which in turn has apertures 48. The shutter member 47 is movable between a position at which it effectively closes the apertures 46 and a position at which each of the apertures 46 has aligned with it one of the apertures 48 so that the pins of a plug may be inserted in the adaptor 40 (Figure 9). The member 47 is associated with cam member 49 having a cam slot 50 which engages the pin 54 fixed the plate 41. Angular relative movement between the pin 54 and member 49 about the axis 44 causes movement of the cam member 49. More



particularly, the member 47 has an abutment 58 which engages the shutter member 47 to move the shutter member 47 to a position at which the apertures 46 are aligned with the apertures 48, when the cam member 49 moves in the direction of the arrow 51 relative to the pin 54. When the cam member 49 moves in the reverse direction 52 relative to the pin 54, the shutter member 47 is permitted to move to a position effectively closing the slots 46 by moving the slots 48 from alignment with the slots 46. However, this movement will only take place upon withdrawal of the plug pins which would retain the shutter member 47 in the "aligned" position. However, there is a spring 55 which urges the shutter member 47 to move to the "non-aligned" position (Figure 10). Accordingly, when the plug is removed the shutter member 47 will move to close the slots 46. It should be appreciated that the pin 54 also projects through an arcuate slot 59 formed in the rear plate 53. The slot 53 has its radius extending from the axis 44. The slot 59 permits relative movement between the pin 54 and plate 58 about the axis 44.

The adaptor 40 further includes a conductor engaging portion 56 which includes the stem 43. The base 45 and the conductor engaging portion 56 are attached as to rotate together about the axis 44 relative to the plate 41.

In use of the above described adaptor 40, the stem 43 is inserted as discussed above to engage the conductors 29. Accordingly, a user of the adaptor 40 inserts the electric plug before rotation of the base 45. Movement of the base 45 in the reverse direction 52 removes the pins 22, 23 and 24 from engagement with the conductors 29. When the electric plug is removed, the shutter member 47 covers the apertures 46.

The pins 22 to 24 extend through the stem 44 and radiate therefrom to sockets 57 internal of the adaptor 40, which sockets 57 are aligned with the apertures 46. Access to these sockets 57 is only permitted when the apertures 48 are aligned with the apertures 46.

The flange 42 of the above mentioned plate 41 could be formed separate from the plate body 78 and snap engage therewith at locations 79. The flange 42 would have an aperture 80 to receive a projection 81 at the end of the stem 43 to aid in supporting the engaging portion 56. The base 45, which is in the form of a "CAP", has an outer wall 82 provided with flanges 83, which intersect to provide a "X" shaped slot 84. The slot 84 receives a correspondingly shaped portion 85 of the stem 43 to aid in fixing the stem 43 to the base 45 so as to rotate therewith.

The body 78 has a slot 85 which enables insertion of the engaging portion 56, with the stem 43 being provided with parallel flanges 86 which engage the rear plate 53 and body 78. Similarly, the rear plate 53 has a slot 87 through which the stem passes.

In Figures 14 to 17 there is schematically depicted a modification of the adaptor 40 of Figures 9 to 12. In this embodiment the same reference numerals have

been employed. However in this embodiment there is further include a disk 60 to which is attached a spring 61. The spring 61 is attached to the mounting plate 41. The disk 60 is attached to or forms part of the stem 43. The spring 61 is attached to the disk 60 at a position such that the stem 43 (and pins 22, 23, and 24) are urged into full  
5 contact with the conductors 29 or alternatively to a position at which are displaced from the conductors 29. Accordingly the base 45 is urged to move to the full on position or the full off position.

Also mounted on the base 45 is a button 62 which is engageable with flanges 63 and 64 forming part of the plate 41. The flange 63 has a slot 65 along which the  
10 button 62 passes while the flange 64 has a slot 66 also along which the button 62 passes. However the flange 64 has an aperture 67 positioned to the button 62, as best seen in Figure 14. Engagement of the button 62 in the aperture 67 retains the housing 45 in the on position.

The button 62 is movably mounted in the base 45 by passing through an  
16 aperture 68 formed therein. The button 62 is urged to move radially outwardly by means of a spring. This spring replaces the spring 55 best seen in Figure 13. When the button 62 is depressed by a user, the housing 45 can be moved back to the flange 63.

## CLAIMS:

1. An elongated flexible electric conductor of unitary construction, said conductor comprising:
  - a pair of generally parallel coextensive electrically conductive strips; and
  - a resilient support urging the strips into contact, said support being resiliently deformable upon transverse relative displacement of the strips when an item to electrically contact the strips is placed therebetween, said support including a plurality of generally "U" shaped ribs providing arms, said ribs extending generally transverse of the strips so that each rib has a respective one of its arms attached to an associated one of the strips.
2. The conductor of claim 1, wherein said support includes a plurality of arms attached to each strip at spaced locations therealong.
3. The conductor of claim 2, wherein the strips have generally planar contact surfaces which engage when not contacting said items.
4. The conductor of claim 3, wherein the arms of each rib are attached by an arcuate base, with each rib further having arcuate portions joining each leg to its associated strip.
5. The conductor of claim 4, wherein the ribs are located at spaced locations along the conductor.
6. An electrical supply assembly, said assembly comprising:
  - an elongated base providing a plurality of generally parallel coextensive slots separated by generally rigid dividing walls, the slots extending from an access passage;
  - a flexible insulator extending along each slot;
  - an elongated conductor located in each insulator; and wherein
  - said access passages enables insertion of a conductive pin in a respective one of the slots for engagement with the conductor located therein.
7. The assembly of claim 6, wherein said base has a longitudinally extending access slot providing access to said access passage, with said passage extending generally horizontally from said access slot and said base slots extend upwardly from said access passage.
8. The assembly of claim 7, wherein the insulators are spaced from the access passage.
9. An electrical adaptor for use with an electric supply assembly having an elongated base within which there is located a plurality of elongated conductors to be engaged by the adaptor, said adaptor comprising:
  - a mounting to engage the assembly so as to be affixed thereto;
  - an engaging portion with a stem having radially extending pins to enter the assembly to engage the conductors, the engaging portion being pivotable relative to said

10

base about a longitudinal axis of the stem between a first position at which the conductors are engaged by the pins, and a second position allowing removal of the engaging portion from within the assembly, said engaging portion also having sockets to engage pins of an electric plug;

5           a base fixed to said engaging portion so as to move therewith, said base generally enclosing said sockets and having apertures aligned with said sockets to provide or access of the electric plug pins to said sockets; and

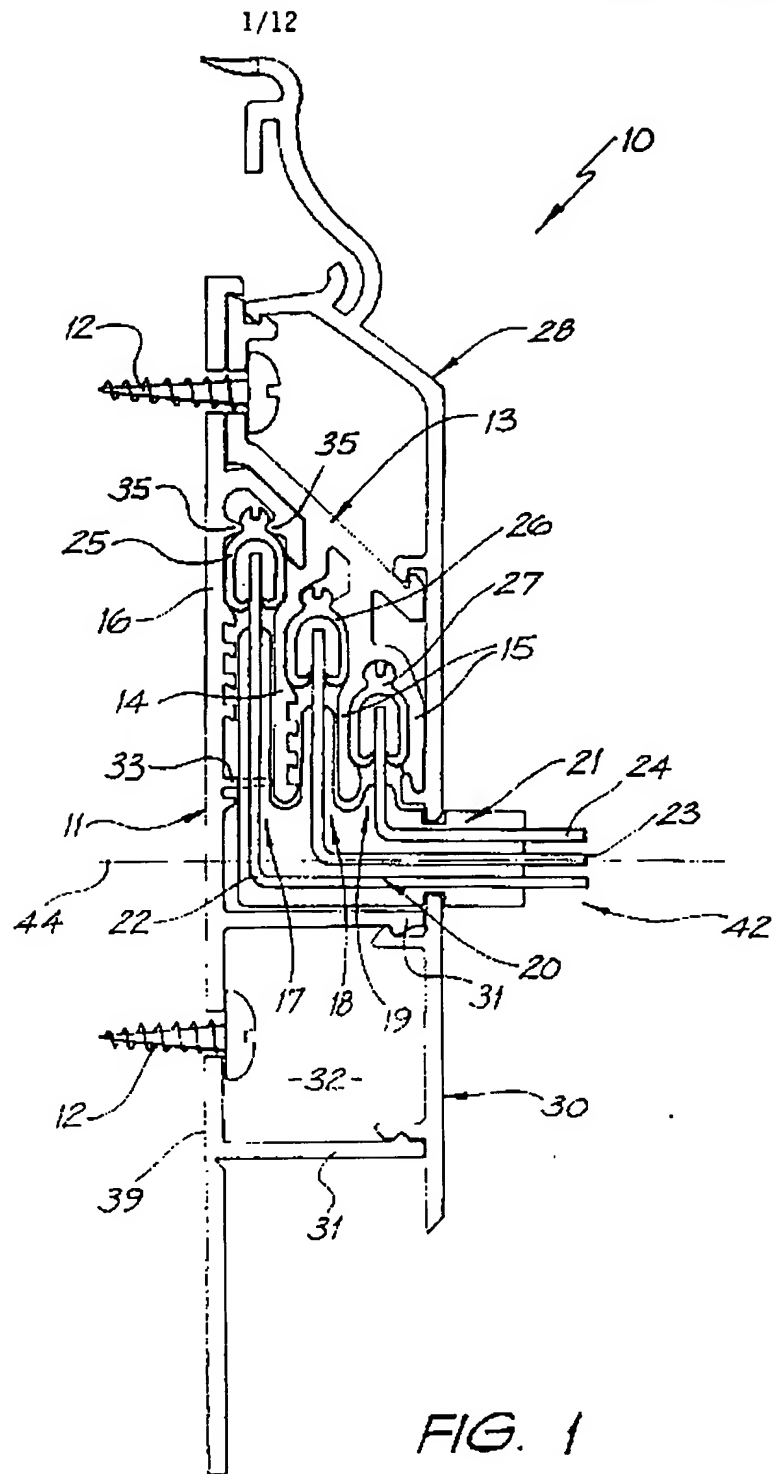
          shutter means to close said apertures when said engaging portion is in said second position but allow access to said sockets when said engaging portion is in said  
10   first position.

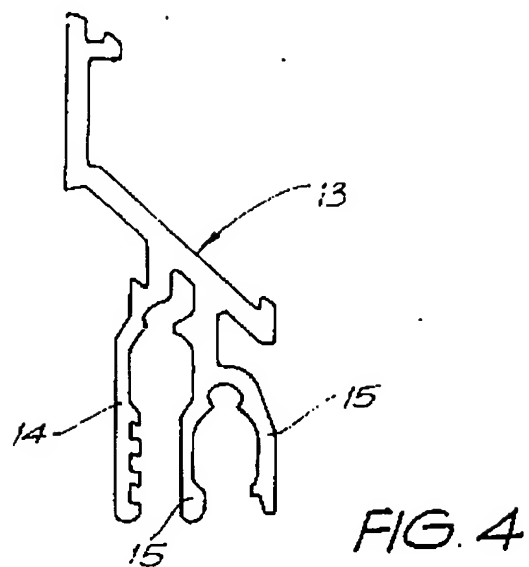
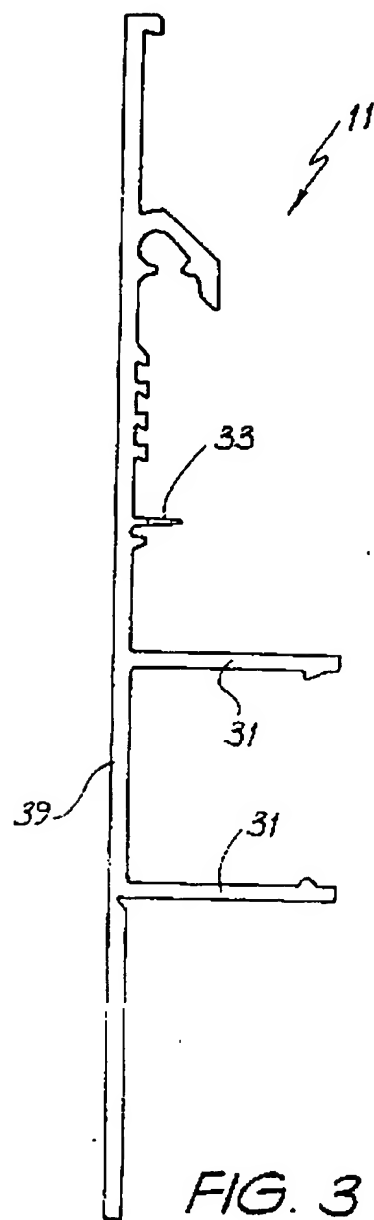
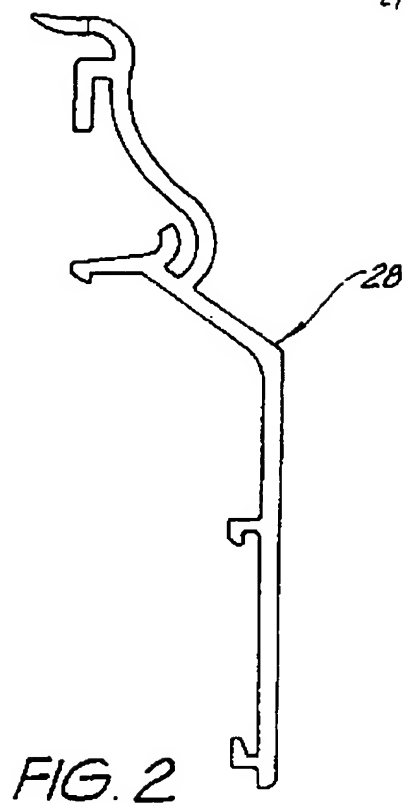
10.       The adaptor of claim 9, wherein said shutter means includes a shutter movably mounted on said base between a first position covering said apertures and a second position providing access to said sockets.

11.       The adaptor of claim 10 further including cam means engaged with  
15   said shutter to move the shutter to the shutter means second position, when said base is moved to the base first position, but releases the shutter for movement to the shutter means first position when the base is moved to the base second position.

12.       The adaptor of claim 11 further including a spring urging the shutter to the shutter means first position.

20       13.       The adaptor of claim 9, wherein the pins of the engaging portion are located at spaced locations along the stem and having radial extremities spaced by different lengths from the stem.





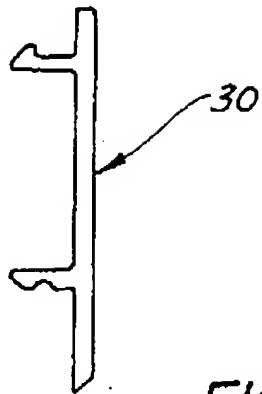


FIG. 5

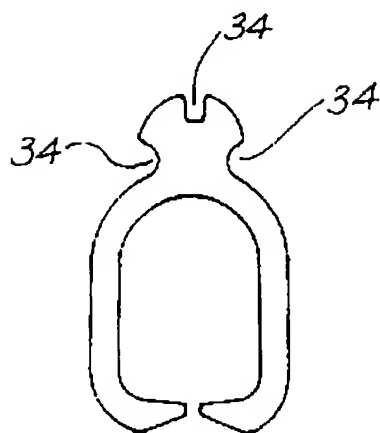
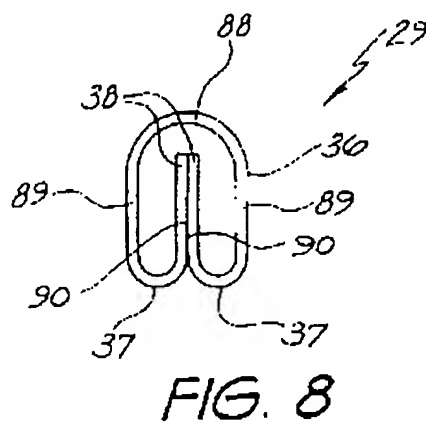
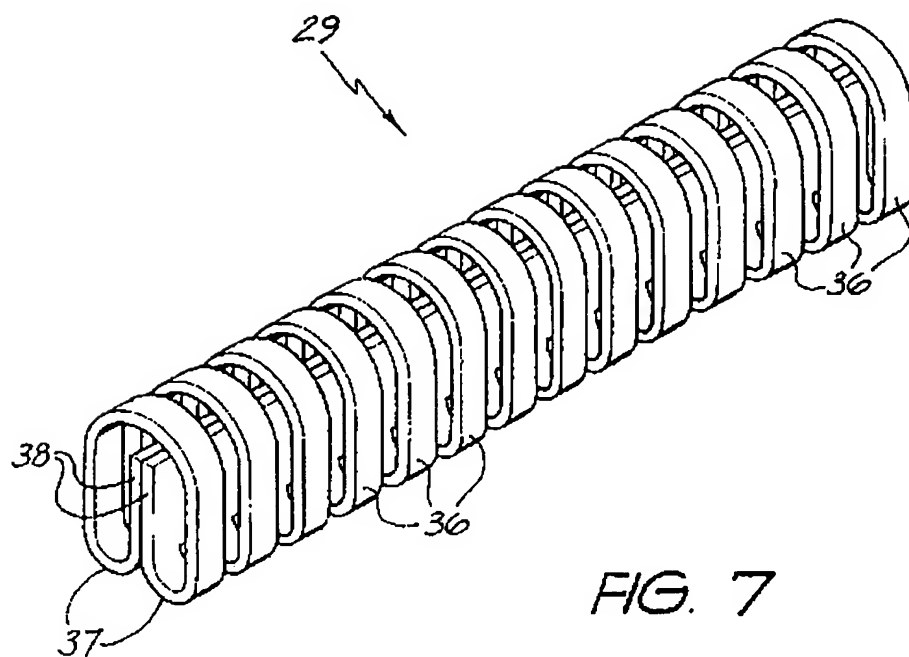
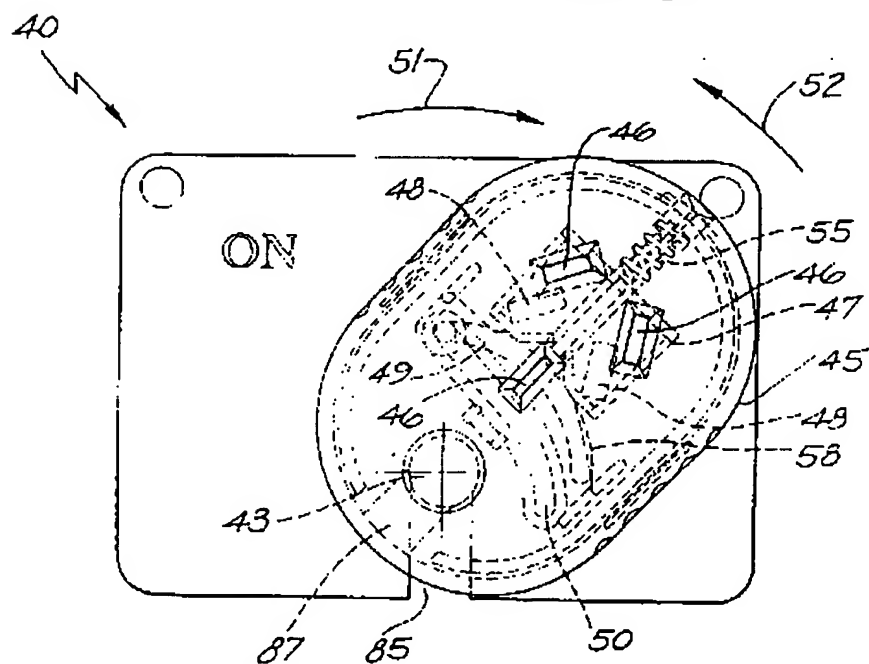
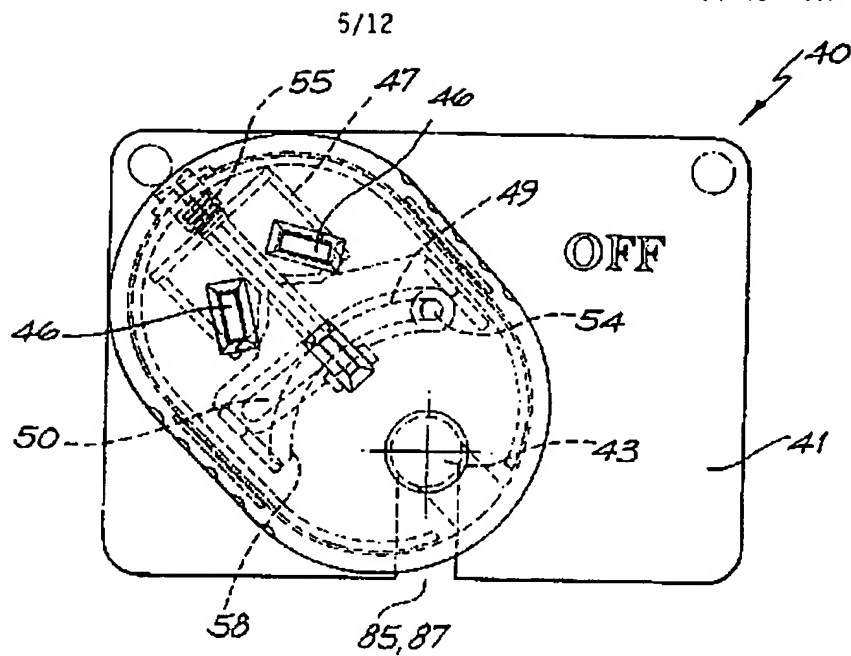


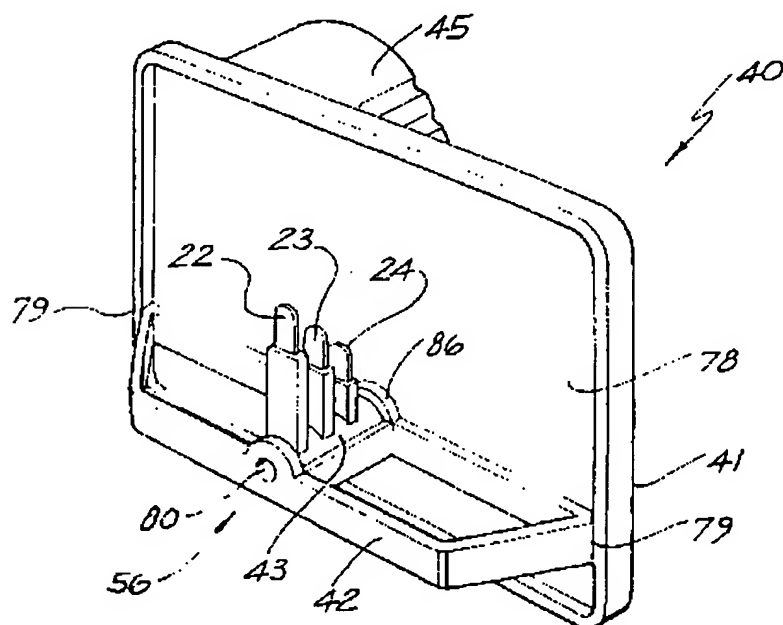
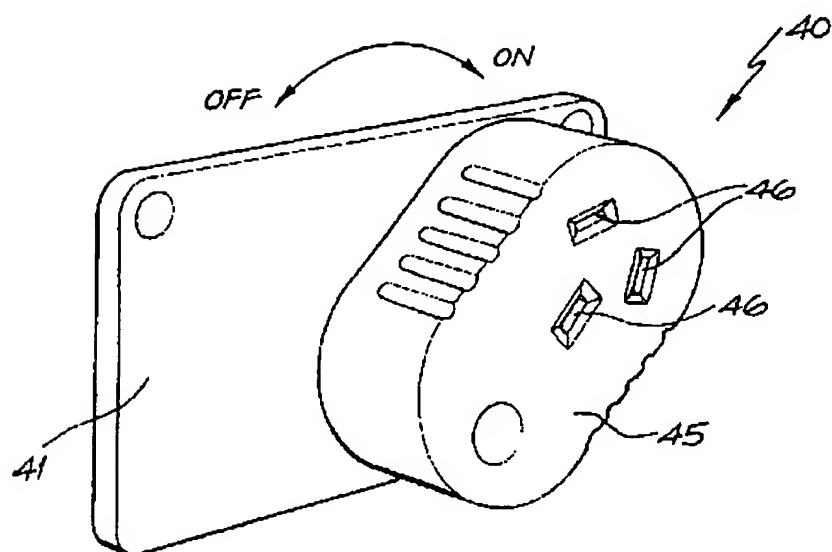
FIG. 6







6/12



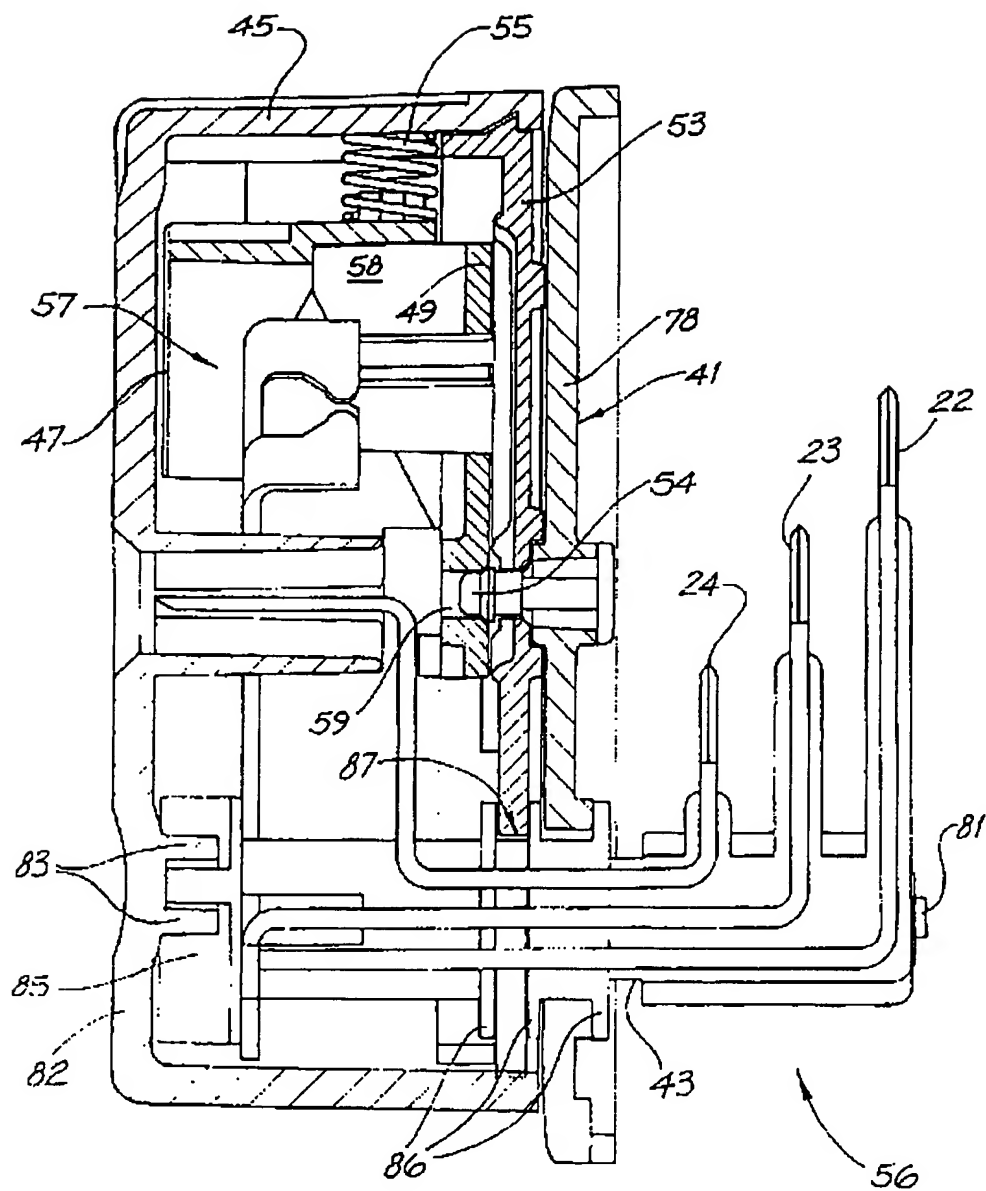


FIG. 13

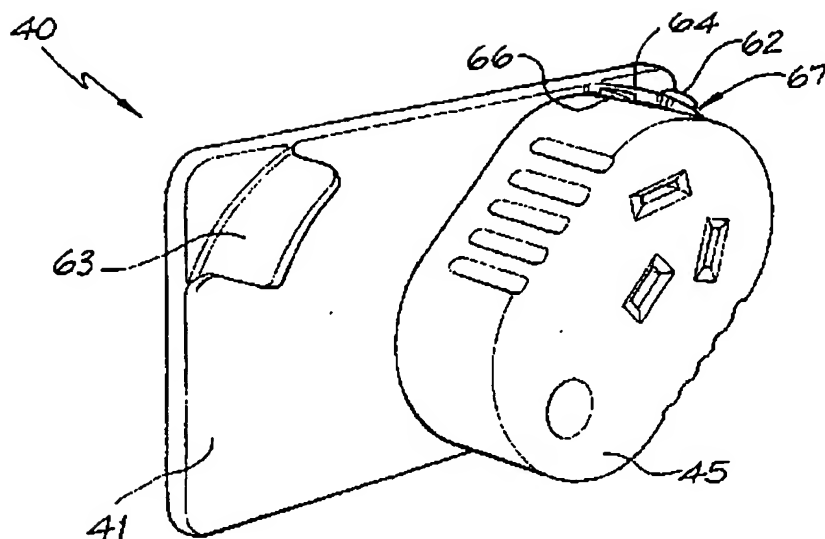


FIG. 14

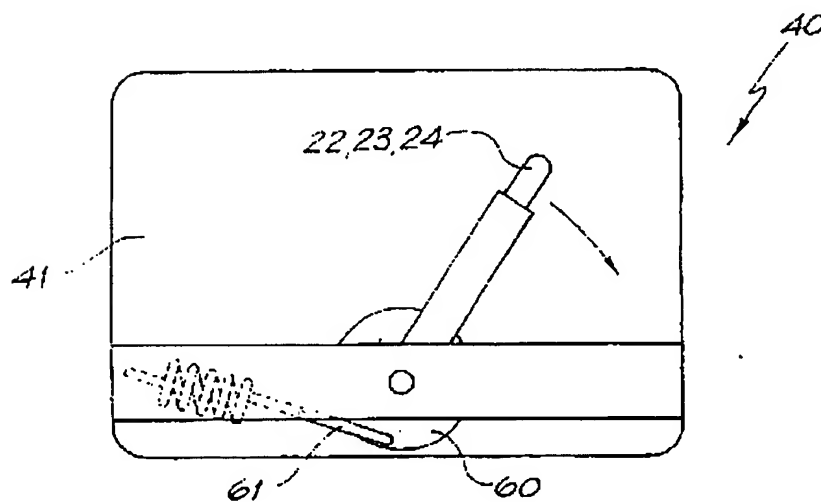


FIG. 15

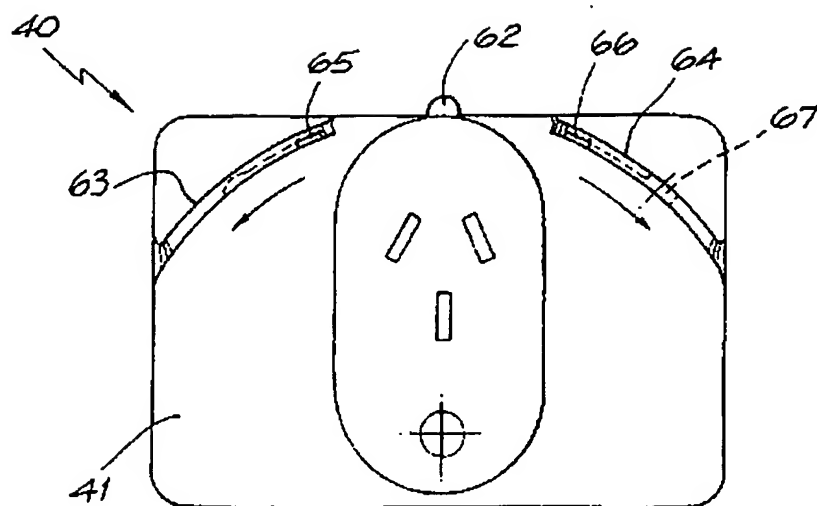


FIG. 16

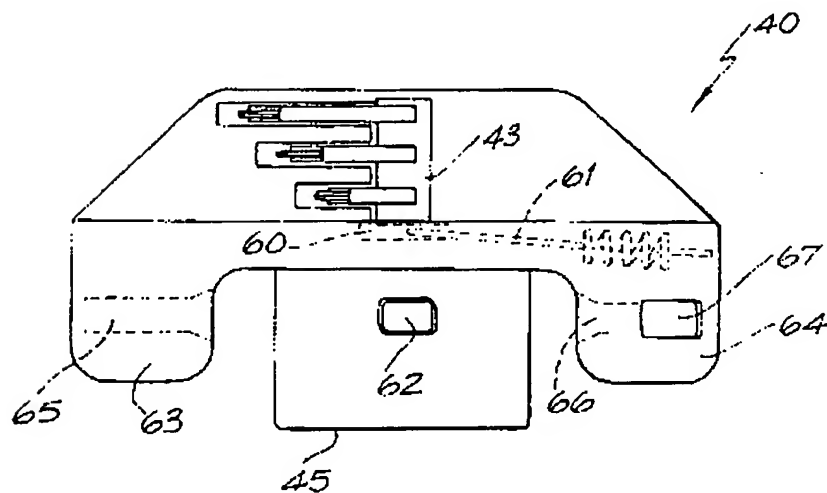


FIG. 17

10/12

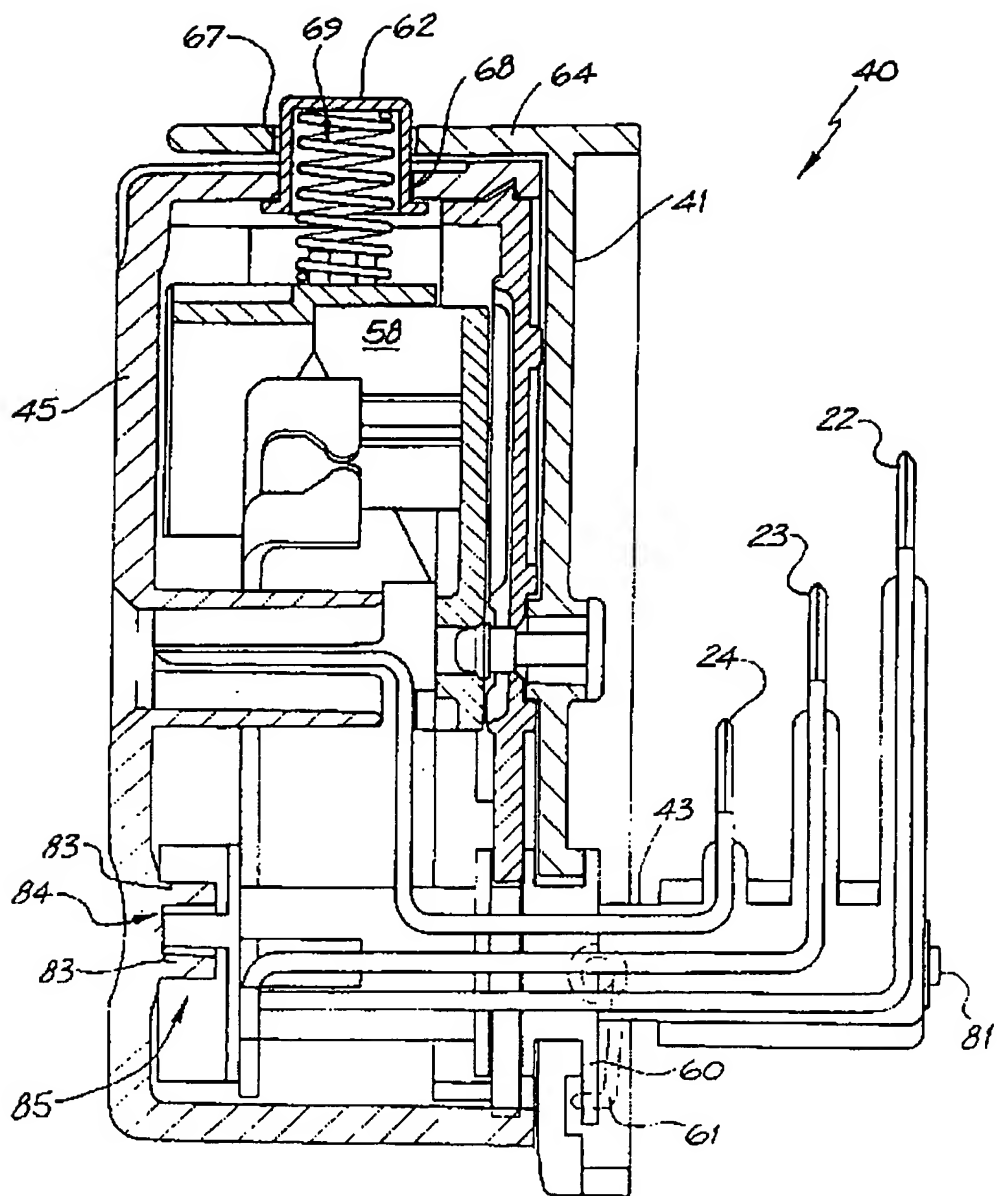


FIG. 18

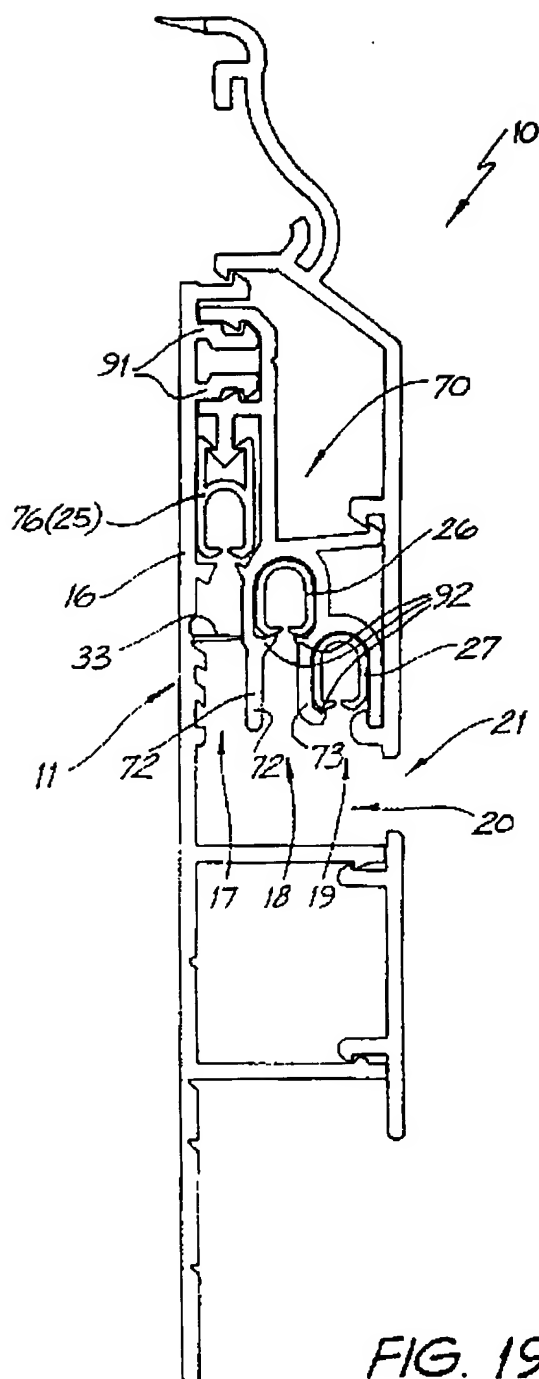


FIG. 19

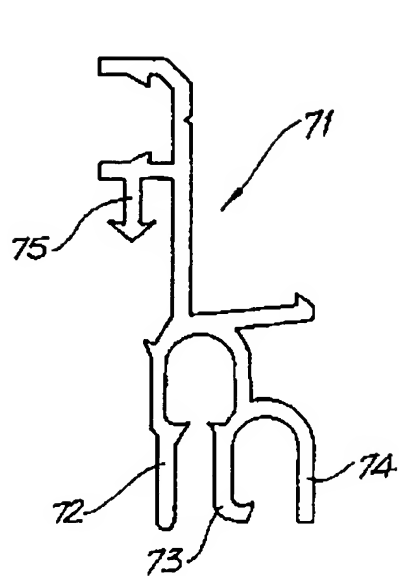


FIG. 21

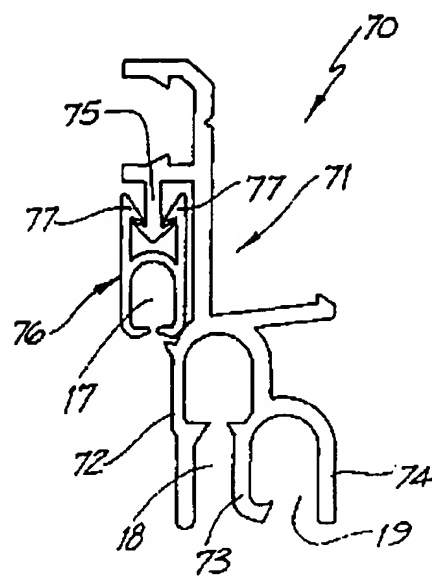


FIG. 20

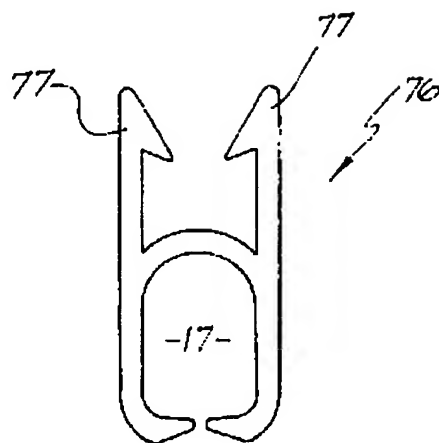


FIG. 22



# INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/AU 97/00589

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
Int Cl <sup>6</sup> : H01R 25/14, H01R, 31/06, H02G 5/04		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) IPC H01R 25/14, 31/06, H02G 5/04		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU:IPC as above		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4553808 A (WEIDLER et al) 19 November 1985 column 3 lines 16 to 52 and figure 1	1 to 3
X	AU 36449/95 A (SINCLAIR) 25 April 1996 page 4 lines 7 to 33, figures 2, 3, 6 and page 5 lines 14 to 20	6 to 8
X	AU 40550/85, A. (WIDELL et al) 10 October 1985 figure 18 and page 12 lines 15 to 24	6 to 8
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 3 October 1997		Date of mailing of the international search report 05 NOV 1997
Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WOJEN ACT 2606 AUSTRALIA Facsimile No.: (02) 6285 3929		Authorized officer  J.W. THOMSON Telephone No.: (02) 6283 2128

**INTERNATIONAL SEARCH REPORT**

International Application No.

**PCT/AU 97/00589****C (Continuation)****DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	AU 46898/72, A. (REININGHAUS) 28 March 1974 figure 6 and page 11, paragraph 3 line 7	6 to 8
X	AU 91501/82 A (WIDELL et al) 23 June 1983 page 32 line 13 to page 33 line 5 and figures 9, 10	6 to 8

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.  
PCT/AU 97/00589

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
US	4553808	MX	155836	AU	26703/84	CA	1211175
		EP	122780	SG	612/89	US	4527857
AU	36449/95	EP	787373	WO	9612327		
AU	40550/85	EP	159556	JP	60230381		
AU	46898/72						
END OF ANNEX							